

Jupiter's Thermal Emission from Cassini, Galileo and Ground-Based Observations: Organization of Temperatures, Clouds and Composition

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The temperature structure and the distribution of clouds and minor constituents in Jupiter's atmosphere can be derived by observing its thermal spectrum. Data from both Galileo's Photopolarimeter-Radiometer (PPR) and Cassini's Composite Infrared Spectrometer (CIRS) provide key extensions of ground-based observations in the thermal infrared. One epoch of confluence for all these sources is in late December, 2000, when Jupiter is encountered by both spacecraft, with support from ground-based observations at NASA's Infrared Telescope Facility. This support is actually a continuation of a collaboration between ground-based and Galileo observations from 1995 through the present. Besides the long-term behavior of planetary-scale phenomena, the ground-based observations also supplement the spectral and spatial coverage and the spectral resolution of the Cassini and Galileo observations. Specific regions on Jupiter of interest to all investigations include the merging white ovals, the Great Red Spot, the polar regions, and 5-micron hot spots. In addition, several types of more global-scale phenomena should be further understood. Among these are the response to seasonal forcing, planetary-scale waves in the stratosphere and troposphere, and the planet-wide distribution of condensable and disequilibrium gases. A portion of this work was supported by a grant from NASA to JPL.